Development and trials of a small-capacity pilot flash dryer for cassava-derived products

Session name: SCALING or QUALITY FOODS

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The ultimate operation in the production process of cassava starch and flour, consists in drying the product from about 40% down to 13% moisture content, to ensure a long shelf-life. In small processing units, the starch is, in most cases, dried in the sun, which proves to be impractical when increasing the processing capacity. It requires large concrete surfaces and the quality is difficult to control due to the variations of weather conditions, outside contamination and the long drying time. Thus, the lack of efficient small-scale dryers is a barrier to the growth of rural processing units.

To address this issue, we conducted a series of works to downscale the flash drying technology commonly employed by industrial starch plants to suits the need of rural processors. Based on the modelling of the flash drying process and on field experience, we designed and built a pilot flash dryer that was started up at CIAT, Cali, Colombia in 2017. It was conceived as a research, development and training tool to facilitate the development of low-cost, efficient small-scale dryers by stakeholders in the cassava sector.

First, we will present the design method and the implementation of the adopted technical solutions, then we will present the results from the first drying experimental trials conducted with native cassava starch. The objective was essentially to evaluate the drying efficiency and to investigate the effects of drying air temperature and pipe length. The specific energy consumption is as low as 3500-4000 kJ/kg of water evaporated (1400-1500 kJ/kg of dried product), which may enable cost-effective drying of cassava flours and starch at small-scale. Indeed, demands for implementing the technology have already arisen from various countries including Colombia, Brazil and Uganda.